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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,774	09/29/2005	Masayuki Kamikawa	H&A-137	1626

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Mattingly Stanger Malur
Suite 370
1800 Diagonal Road
Alexandria, VA 22301

EXAMINER	
NGUYEN, TU MINH	
ART UNIT	PAPER NUMBER
3748	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,774	KAMIKAWA ET AL.	
	Examiner	Art Unit	
	TU M. NGUYEN	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-9 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-9 and 11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Amendment filed on March 18, 2009 has been entered. Claims 2 and 10 have been canceled; and claims 1, 3, 4, 6, 9, and 11 have been amended. Overall, claims 1, 3-9, and 11 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deeba (U.S. Patent 6,912,847) in view of Stroia et al. (U.S. Patent 6,820,414).

Re claims 1 and 11, as shown in Figure 2, Deeba discloses an exhaust gas purifying apparatus and an exhaust gas purifying method for a diesel engine, the apparatus comprising:

- an NOx adsorption and reduction type catalyst (21) that adsorbs and reduces NOx in an exhaust gas; and

- a diesel particulate filter (15) that collects particulate matters in the exhaust gas from the upstream side of a flow of the exhaust gas,

wherein the catalyst (21) and filter (15) being arranged sequentially in an exhaust channel that exhausts the exhaust gas of the diesel engine; and

wherein the NOx adsorption and reduction type catalyst includes at least one type of element chosen from potassium, sodium, magnesium, strontium, and calcium (lines 55-57 of column 5), at least one type of element chosen from a rare earth metal such as cerium (lines 6-9 of column 7), at least one type of element chosen from precious metals such as platinum, rhodium, and palladium (lines 24-29 of column 7), and at least one type of an element chosen from titanium or silicon, and is a composite composed of a metal, metal oxides, or a compound oxide, or a composite in which the composite is carried in porous heat resistant metal oxides (see lines 3-10 of column 8).

Deeba, however, fails to disclose that an oxidation catalyst is arranged on the downstream side of the diesel particulate filter viewed from the flow of the exhaust gas.

As shown in Figure 1, Stroia et al. disclose an after-treatment system having a soot filter (18) and a dual NOx adsorbers (26, 28) arranged in parallel. As indicated on lines 9-17 of column 5, Stroia et al. teach that it is conventional in the art to utilize an oxidation catalyst (40) arranged on the downstream side of the soot filter and the NOx adsorbers in order to remove unburned HC that slip through the NOx adsorbers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the oxidation catalyst taught by Stroia et al. in the apparatus of Deeba, since the use thereof would have been routinely practiced by those with ordinary skill in the art to prevent inadvertent release of harmful HC emissions into the atmosphere.

Re claim 3, in the modified exhaust gas purifying apparatus of Deeba, as taught by Stroia et al., the oxidation catalyst (40) is a three-way catalyst that adsorbs NOx in the exhaust gas, and is a hydrocarbon adsorption and combustion type catalyst that adsorbs NOx in the exhaust gas, burns hydrocarbon and purifies the NOx.

4. Claims 1, 3-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitahara (PCT Publication No. WO 03/018972) (see U.S. Patent 6,796,118 for the English equivalence) in view of Stroia et al. and Deeba.

Re claims 1 and 11, as shown in Figure 1, Kitahara discloses an exhaust gas purifying apparatus and an exhaust gas purifying method for a diesel engine (1), the apparatus comprising:

- an NOx adsorption and reduction type catalyst (13) that adsorbs and reduces NOx in an exhaust gas; and

- a diesel particulate filter (14) that collects particulate matters in the exhaust gas from the upstream side of a flow of the exhaust gas,

wherein the catalyst (13) and filter (14) being arranged sequentially in an exhaust channel that exhausts the exhaust gas of the diesel engine.

Kitahara, however, fails to disclose the structure of the NOx adsorption and reduction type catalyst; and that an oxidation catalyst is arranged on the downstream side of the diesel particulate filter viewed from the flow of the exhaust gas.

As shown in Figure 1, Stroia et al. disclose an after-treatment system having a soot filter (18) and a dual NOx adsorbers (26, 28) arranged in parallel. As indicated on lines 9-17 of column 5, Stroia et al. teach that it is conventional in the art to utilize an oxidation catalyst (40) arranged on the downstream side of the soot filter and the NOx adsorbers in order to remove

unburned HC that slip through the NOx adsorbers. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the oxidation catalyst taught by Stroia et al. in the apparatus of Kitahara, since the use thereof would have been routinely practiced by those with ordinary skill in the art to prevent inadvertent release of harmful HC emissions into the atmosphere.

As shown in Figure 2, Deeba discloses an exhaust gas purifying apparatus for a diesel engine, comprising an NOx adsorption and reduction type catalyst (21) that adsorbs and reduces NOx in an exhaust gas and a diesel particulate filter (15) that collects particulate matters in the exhaust gas from the upstream side of a flow of the exhaust gas, wherein the catalyst (21) and filter (15) being arranged sequentially in an exhaust channel that exhausts the exhaust gas of the diesel engine. Deeba teaches that it is conventional in the art to use an NOx adsorption and reduction type catalyst that includes at least one type of element chosen from potassium, sodium, magnesium, strontium, and calcium (lines 55-57 of column 5), at least one type of element chosen from a rare earth metal such as cerium (lines 6-9 of column 7), at least one type of element chosen from precious metals such as platinum, rhodium, and palladium (lines 24-29 of column 7), and at least one type of an element chosen from titanium or silicon, and is a composite composed of a metal, metal oxides, or a compound oxide, or a composite in which the composite is carried in porous heat resistant metal oxides (see lines 3-10 of column 8). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NOx adsorption and reduction type catalyst taught by Deeba in the apparatus of Kitahara, since the use thereof would have been routinely practiced by those with ordinary skill in the art to purify harmful NOx emissions with high efficiency.

Re claim 3, in the modified exhaust gas purifying apparatus of Kitahara, as taught by Stroia et al., the oxidation catalyst (40) is a three-way catalyst that adsorbs NOx in the exhaust gas, and is a hydrocarbon adsorption and combustion type catalyst that adsorbs NOx in the exhaust gas, burns hydrocarbon and purifies the NOx.

Re claims 4-5, the modified exhaust gas purifying apparatus of Kitahara further includes heating means (rich operation in step S13 or S15 of a routine in Figure 2) that heats the exhaust gas on the upstream side of the exhaust gas channel of the NOx adsorption and reduction type catalyst; and heating means (rich operation in step S19 of Figure 2) that heats the diesel particulate filter.

Re claims 6-8, from a routine illustrated in Figure 2, the modified exhaust gas purifying apparatus of Kitahara further comprises:

- NOx amount estimation means (step S3) that estimates an amount of NOx accumulated in the NOx adsorption and reduction type catalyst from a measured value of a physical quantity that represents an operation condition of the diesel engine such as temperature, an air-fuel ratio, oxygen concentration, and a lean operation time of an exhaust gas that flows into the NOx adsorption catalyst (see lines 44-52 of column 4); and

- control means that, when the amount of accumulated NOx estimated by the NOx amount estimation means reaches a fixed value (step S10 with YES answer), performs control (step S13 or S15) of increasing the temperature of the exhaust gas that flows into the NOx adsorption and reduction type catalyst to a temperature necessary for NOx reduction and purification, and supplying fuel that is a reducing agent necessary for reducing accumulated NOx to the exhaust gas,

wherein the fuel that is a reducing agent necessary for reducing NOx is supplied to the exhaust gas by increasing the amount of the fuel supplied to the diesel engine by means of a fuel secondary injection that injects the fuel (rich condition in premix combustion) to an engine combustion chamber in an expansion stroke of the diesel engine.

Re claim 9, as shown in Figures 2 and 4, the modified exhaust gas purifying apparatus of Kitahara further comprises:

- exhaust gas temperature measuring means (25) that measures the temperature of the exhaust gas that flows into the diesel particulate filter (14);

- exhaust gas temperature judgment means that judges when the exhaust gas temperature measured by the exhaust gas temperature measuring means is lower than a predetermined temperature (step S28 with NO answer);

- particulate capture amount estimation means (step S5) that estimates an amount of particulates captured by the diesel particulate filter; and

- heating means (step S19) that heats the exhaust gas,

wherein control of heating the exhaust gas into the predetermined temperature (step S19) is performed by the heating means, and the particulates captured by the diesel particulate are burned and removed when an estimated value of the amount of particulates estimated by the particulate capture amount estimation means reaches a predetermined capture amount (step S18 with YES answer), and the exhaust gas temperature is judged by the exhaust gas temperature judgment means to be a lower temperature than the predetermined temperature (step S28 with NO answer).

Response to Arguments

5. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are moot in view of the new ground(s) of rejection.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office Action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Prior Art

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of one patent: Hu et al. (U.S. Patent 7,062,904) further disclose a state of the art.

Communication

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tu M. Nguyen/

TMN

Tu M. Nguyen

June 19, 2009

Primary Examiner

Art Unit 3748